

What is claimed is:

*Sub A1*

1. An orthopedic implant comprising:  
a bone fixating prosthesis comprising an interconnecting network of metallic fibers, and  
one or more reinforcing elements secured to said network of metallic fibers, wherein said  
implant is adapted for promoting fusion between adjacent bone structures.
2. The implant of claim 1 comprising at least one of an osteogenic material or a  
pharmaceutical agent.
3. The implant of claim 1 comprising fibers formed of one or more of: stainless  
steel, cobalt-chrome alloy, titanium, titanium alloy, or nickel-titanium shape memory alloys.
4. The implant of claim 1 wherein the network of fibers is substantially nonelastic.
5. The implant of claim 1 wherein the network of fibers comprises a three  
dimensional array of fibers.
6. The implant of claim 1 wherein the network of fibers comprises a deformable  
sheet or fabric-like material.
7. The implant of claim 6 wherein at least a portion of the network of fibers is  
deformable to conform to a selected bone structure.
8. The implant of claim 1 comprising a second network of fibers formed of a  
material selected from the group consisting of: biocompatible polymeric materials, nylon fibers,  
carbon fibers, glass fibers, collagen fibers, ceramic fibers, polyethylene fibers, poly(ethylene  
terephthalate), polyglycolides, polylactides, and combinations thereof.
9. The implant of claim 8 wherein the second network of fibers is biodegradable.

10. The implant of claim 1 comprising reinforcing elements formed of a material selected from the group of: stainless steel, cobalt-chrome alloy, titanium, titanium alloy, or nickel-titanium shape memory alloys, biocompatible polymeric materials, nylon fibers, carbon fibers, glass fibers, collagen fibers, ceramic fibers, polyethylene fibers, poly(ethylene terephthalate), polyglycolides, polylactides, and combinations thereof.

11. The implant of claim 1 wherein said interconnecting network of fibers comprises a first set of fibers interwoven or bonded to a second set of fibers.

12. The implant of claim 1 adapted to secure to at least two adjacent vertebral bodies to promote spinal fixation.

13. The implant of claim 1 adapted to be inserted into a prepared disc space to promote spinal fusion.

14. The implant of claim 1 wherein at least a portion of the interconnecting network of fibers is impregnated with an osteogenic material.

15. The implant of claim 1 comprising a first interconnecting network of fibers overlayed with a second interconnecting network of fibers.

16. The implant of claim 15 wherein the first interconnecting network of fibers comprises a three dimensional array of fibers.

17. The implant of claim 15 wherein the implant is deformable to conform to a selected bone structure.

18. The implant of claim 15 wherein the first and second network of fibers are secured together using a securing element selected from the group consisting of: an adhesive, a curable polymeric material, a suture, a staple, and combinations thereof.

19. The implant of claim 15 wherein the first and second network of fibers are secured together to provide a barrier sufficiently porous to permit interdiffusion of an osteogenic material therethrough.

20. The implant of claim 1 comprising a second set of fibers formed of a biocompatible polymeric material.

21. The implant of claim 1 wherein the reinforcing element is formed of a shape memory polymeric or metallic alloy material.

22. The implant of claim 1 wherein the reinforcing element is adapted to conform to a preselected bone structure.

23. The implant of claim 1 adapted to interconnect proximal bone structures as a prosthetic ligament, a tension band or an external fixation device.

24. A bone plate comprising:  
an interconnecting network of metallic fibers providing a substantially nonelastic bone support;  
an osteogenic material impregnated on said fibers, and  
a bone fastener.

25. The bone plate of claim 24 comprising fibers formed of a shape memory metallic alloy.

26. The bone plate of claim 24 comprising fibers formed of one or more of: stainless steel, cobalt-chrome alloy, titanium, titanium alloy, or nickel-titanium shape memory alloys.

27. The bone plate of claim 24 wherein the network of metallic fibers comprises a three dimensional array of fibers.

28. The bone plate of claim 24 wherein the interconnecting network of metallic fibers is deformable to conform to a selected bone structure.

29. The bone plate of claim 24 wherein the bone fastener is a bone cement.

30. The bone plate of claim 24 wherein the bone fastener comprises at least one of: a bone screw, a suture, or a staple.

31. The bone plate of claim 24 comprising one or more reinforcing elements formed of a material selected from the group of: stainless steel, cobalt-chrome alloy, titanium, titanium alloy, or nickel-titanium shape memory alloys, biocompatible polymeric materials, nylon fibers, carbon fibers, glass fibers, collagen fibers, ceramic fibers, polyethylene fibers, poly(ethylene terephthalate), polyglycolides, polylactides, and combinations thereof.

32. An orthopedic implant for promoting bone fusion, said implant comprising:  
a body including a wall portion formed of an interconnecting network of metallic fibers, said body defining an internal cavity; and  
at least one reinforcing element connected to said fibers.

33. The implant of claim 32 comprising an osteogenic material.

34. The implant of claim 32 comprising fibers formed of one or more of: stainless steel, cobalt-chrome alloy, titanium, titanium alloy, or nickel-titanium shape memory alloys.

35. The implant of claim 32 wherein the network of metallic fibers is substantially nonelastic.

36. The implant of claim 32 wherein the network of fibers comprises a three dimensional array of fibers.

37. The implant of claim 32 comprising an opening through said wall portion into said internal cavity.

38. The implant of claim 32 comprising a core material disposed in the internal cavity.

39. The implant of claim 38 wherein the core material comprises an osteogenic material.

40. The implant of claim 38 wherein the core material is a curable material.

41. A method of treating a bone defect, said method comprising implanting an implant according to claim 35 proximal to a bone defect.

42. An orthopedic implant comprising:  
a plurality of metallic fibers interconnected together at junctures to form a network;

two or more elongate members extending across a portion of the network adjacent said junctures, each of said elongate members provided to exhibit a tensile strength greater than a selected metallic fiber of the plurality of metallic fibers;

an osteogenic material impregnated in said network, wherein said implant is adapted to induce bone fusion between adjacent bone structures.

43. An orthopedic implant for promoting bone fusion, said implant comprising:  
a body including a wall portion formed of an interconnecting network of metallic fibers, said body defining an internal cavity and having an opening through the wall portion into the internal cavity; and

at least one elongated member extending into said cavity, said elongated member provided to exhibit a tensile strength greater than a selected metallic fiber of the interconnecting network of metallic fibers wherein said implant is adapted to induce bone fusion between adjacent bone structures.

44. An orthopedic implant for connecting adjacent bone structures, said implant comprising:

an interconnecting network of metallic fibers each fiber joined to an adjacent fiber at a juncture; said interconnecting network bounded by a reinforcing band;

two or more elongate members extending across a portion of the network adjacent said junctures, each of said elongate members provided to exhibit a tensile strength greater than a selected metallic fiber of the interconnecting network of metallic fibers;

an osteogenic material adhered to at least a portion of the implant, said implant adapted to promote bone ingrowth.

45. Method of treating a bone defect, said method comprising:

preparing a site of treatment to accept an orthopedic implant;

implanting proximal to said site an orthopedic implant comprising an interconnecting network of metallic fibers, and one or more reinforcing elements secured to said network of metallic fibers,

applying an osteogenic material to said implant or to said bone defect to promote bone fusion.

46. The method of claim 45 wherein said implant is a bone plate.

47. The method of claim 45 wherein said implant is a bone spacer.

48. The method of claim 45 wherein said implant comprises a body defining a cavity.

49. The method of claim 45 wherein said applying comprising applying the osteogenic material to the implant prior to implantation.

50. The method of claim 45 wherein said applying comprising applying the osteogenic material to the implant after implantation.